Lesson 14 - Water Transports Nutrients To All The Body Cells

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- Article #1: The Fountain Of Life By Herbert M. Shelton

1. Water Is The Essence Of Life

Water is the prime essence of life! The functioning of our planet is dependent upon its massive reservoirs of water and its complex system of atmospheric water dispensation. In our oceans, rivers, underground aquifiers, and streams, water prevails and abounds. No one would argue with the statement that without water, life as we know it would be impossible. Even if life were possible without water, most of the beauty of life would be lost in its absence. Dull, barren rocky landscapes devoid of vegetation would be prevalent everywhere. The clouds that color rosy and multi-hued in our sunrises and sunsets would be nonexistent.

The fact is that water is a major need of all forms of life. Fortunately for us, in most places on Earth, water is abundant. There's water in all of the foods we eat. Even dry foods like nuts and seeds have water content. Fruits possess plenty of pure water which is ideal for human functioning.

How does our body use water? What is the best kind of water for its functioning? These are questions this lesson addresses.

2. Water's Role In The Body

2.1 How Body Water Is Obtained

The average adult is composed of almost 60% fluid. That's more water than the total of all other substances in the body! Our body's water is obtained from the fluids we drink and from the water content of the foods we eat. It is also obtained from the body's internal oxidation reactions. The

oxidation process occurs in the combining of hydrogen in the food we eat with the oxygen we breathe. Some animals are dependent on the oxidative water they produce for their very existence.

2.2 Minerals In the Body Fluids

The water within our body contains many materials in solution; that is, it contains many substances dissolved in it. The complement of minerals dissolved in the body fluid are referred to as salts. These salts include sodium, calcium, magnesium, potassium, chlorine, phosphorus and other elements. They possess electric charges and are thereby referred to as *electrolytes*.

Some salts possess positive electrical charges and others possess negative charges. These charges, inherent in the salts, are part of the regulatory process in the movement of fluids within the body. The positively and negatively charged particles exist1 in equally balanced amounts in the body. The resultant charge between the particles is therefore neutral.

It is true that the balance of salts is crucial to the proper functioning of the human organism. It is, however, not necessary that we udd substances such as table salt, baking soda, mineral supplements or mineralized waters to our diet in order to assure ourselves of the proper complement of salts. Our bodies, as you will remember from Lesson 10 on minerals, can assimilate and utilize only organic minerals as are found in foods. Adding table salt to the diet is literally adding a poison I We'll discuss this in more detail later in the lesson.

2.3 Cellular Fluids

About three-fourths of the body's fluid is stored within the cells and is known as *cellular fluid*. The extracellular fluid is composed of *plasma and interstitial fluid*.

Blood plasma, a clear, yellow-colored fluid, is approximately 92% water. The plasma carries within it a huge volume of substances. It transports mineral salts and carries carbohydrates, proteins, gases, enzymes, fats and hormones. There are certain plasma proteins that are always present in the plasma. Other materials are in a constant state of change. The amounts of food materials (such as glucose), carbon dioxide and nitrogen wastes are constantly changing in the plasma.

Interstitial fluid is similar to plasma except it does not contain the plasma's complement of proteins. However, interstitial fluid does contain glucose, minerals and urea and it continually bathes the cells. Through this bathing, the cell is supplied with all its needs for existence.

In addition to the circulatory system formed by the blood, yet another system exists and flows through the lymph vessels. The lymph circulation, along with the blood, is responsible for the flow and mixing of the extracellular fluid. One of the major functions of the lymph vessels is the return of the proteins to the circulation after they leave the bloodstream. The lymph provides the only routing whereby these "plasma proteins" can be restored to the circulation. Another part of the lymphatic system consists of small filtering organs called lymph nodes, which filter the lymph fluid as it passes through.

2.4 The Inner Sea and Its Movements

The fluids in our body are true life-keepers and can be likened unto an ocean in which literally trillions of cells, themselves largely water, are immersed. Within this "ocean" the materials we need for our survival are carried. In addition, the same system is responsible for carrying away our wastes, such as nitrogen, unusable minerals and other toxic substances.

The nutrients our body needs are broken down from foodstuffs in the digestive system. After they are broken down they are water-soluble. This means they can be mixed with water and dissolved in it. When the nutrients are, put into solution, the pass through the capillaries (small tubes) within the intestinal wall. The blood flowing in these walls picks up the tiny particles of nutrients. Through the circulatory

system, the nutrients are finally distributed by the extracellular fluid bathing the cells.

When the nutrients are finally distributed by the circulatory system to the cells, how do they make themselves available for use by the cells themselves?

It is the responsibility of the circulatory system to distribute the nutrients and bathe the cells with them. The process by which needed materials are absorbed (and also by which wastes leave the cell) are known by the names *diffusion*, *osmosis* and *active transport*.

Diffusion is merely the arbitrary movement of particles through the cell walls. The movement of the particles is limited by the size of the pores of the cell wall (cellular membrane). The cellular membrane is a semipermeable membrane—it allows only certain substances in particular forms to pass through it. This factor is very crucial to the cell's existence. If the cellular membrane did not have the capacity to keep some substances outside of the cell and others permanently inside, the cell would be no different in composition from the fluid surrounding it, and it would not be able to maintain its distinct life.

Osmosis refers to the particular process in which the balance of salts takes place. Water tends to go where the greater concentration of salt lies; in other words, water will pass through the semipermeable membrane from a lesser concentrated salt solution to a greater concentrated solution. The result is that the proportion of positive and negative electrolytes is balanced. An easy way to remember the term osmosis is that it's a fancy way of saying that in cellular metabolism, water goes where the salt is.

At this point, mention should be made that this action of water is not an intelligent one done by the water. Water is utilized by the body; it is itself an inert substance and does not act upon the body.

In addition to osmosis and diffusion, a process called *active transport* occurs, in which electrolytes move across the cellular membrane from an area of lesser salt concentration to an area of great salt concentration.

Fluids constantly flow through the cellular membranes in both directions—both into and out of the cell —through these processes of diffusion, osmosis and active transport. However, the total amount of cellular fluid and the total amount of extracellular fluid remain at a constant balance during this interchange. There is a real need for this precisely balanced flow of fluids between the cellular fluid and the extracellular fluid, so that the cells within the body do not continually shrink and expand.

An example illustrates the importance of this balance of fluids. If the cells were immersed in distilled water, they would grow to the point of bursting because distilled water is so much less dense than the fluid in the cells! Conversely, if the cells were surrounded by e strong salt solution, the cells would lose their water and shrivel up. These examples are an impossibility in the functioning of our organism, but they do point to the need for the proper balancing of both the amounts and types of fluids to which our cells are exposed.

Now let's see what happens when the processes of diffusion, osmosis and active transport occur within the body. Glucose, or blood sugar, is a primary nutritive factor derived from foods. It is the immediate fuel of the cells of the body and is distributed by the extracellular fluids. The liver is responsible, among other things, for regulating the amount of blood sugar that reaches the cells. It also forms proteins from amino acids, which are then dissolved in the plasma. These plasma proteins float in the watery part of the blood and are easily absorbed by the individual cells, which break it down again into its component amino acids.

Minerals can be directly absorbed from the small intestine and put into the bloodstream without undergoing chemical change.

2.3 Waste Removal

Thus far we have been discussing water's role in delivering nutrients to the body's cells. Water plays an equally significant role in removing the wastes of the body.

One of the more persistently produced wastes by humans and animals alike is carbon dioxide. The body has uses for a small amount of carbon dioxide, but would expire could it not expel its excesses! In the process of carbon dioxide expulsion, the cells firstly allow their excess carbon dioxide to diffuse into the extracellular fluid. Later the lungs exhale the unneeded carbon dioxide. Blood is able to carry carbon dioxide because carbon dioxide is easily dissolved in the blood's water.

Another waste that the body continually produces is nitrogen. Nitrogen is basically a by-product of protein metabolism. The elimination of nitrogen is not as simple as that of carbon dioxide; it cannot merely be discharged as nitrogen gas. Our organism has not developed the capacity to discharge nitrogen. If nitrogen were combined with hydrogen in the bloodstream, it would form the extremely toxic substance ammonia. The ammonia would then itself poison the body. Therefore, nitrogen must be expelled in a form that is not itself toxic to the human body. Ammonia combines with carbon dioxide, itself a waste product of humans, to form *urea*. Urea itself is a solid, but it is easily dissolved in the water within the bloodstream.

Urea would quickly reach a toxic level within the body were it not for the functioning of the kidneys. It is the job of the kidneys to filter the blood. They also return to the bloodstream the substances in blood that the body needs. The waste products, including urea, are not reabsorbed but are mixed with water to form urine, which is afterwards expelled through the bladder.

As stated earlier, nitrogen is a by-product of protein metabolism. It costs the body energy to expel this substance in the form of urea. A person following the Life Science regime and eating a diet of raw fruits, vegetables, nuts and seeds will not have as many proteinacious wastes as someone eating a conventional diet of processed foods, meats and dairy products and thereby will expend less energy in expelling these wastes. The urine of a person who is eating a conventional diet high in protein is apt to be darker and thicker than the urine of a person who eats Hygienically.

2.4 Water Cools the Body

One of the major reasons the water balance in the body is so crucial to our health is water's direct relationship to the temperature regulation of the body. Some. animals, such as the camel, actually undergo large differences in body temperature dependent on the air. temperature around them. Yet an internal temperature change of even a very few degrees can mean death to a human being.

A "normal" human adult gains about two and one-half quarts of water daily. To maintain bodily balance, one also loses approximately the same amount. This water is gained from food and liquid sources, and also, from oxidative sources. Oxidative water is merely water that is formed by the chemical reaction of hydrogen combining with oxygen within the body.

The body loses water through the kidneys and bowels. It also loses water through the lungs, and through the skin as perspiration. Perspiration cools the skin when it evaporates, which helps to maintain body temperature, but it can be dangerous or even fatal if the body loses too much water. On an extremely hot day we may lose as much as a quart of water per hour through perspiration. Losing eight quarts by this method would mean death.

When water is lost by the blood, the blood becomes denser. When this happens, water is drawn into the capillaries from the intercellular fluid so that the blood can maintain its flow and carry away unneeded heat in the body.

The skin stops the evaporation of the water in the body. It is the structure from which 85% of the body's heat is lost. Sweat is a clear fluid, mostly water, and it may contain toxins. Sweat is excreted through the pores of the skin. Heat is lost by radiation and the evaporation of sweat from the skin. Typically we may lose a pint of water daily due to sweat.

3. Other Body Uses Of Water

The body needs water for the proper functioning of its glandular systems. The salivary glands in the mouth and the glands in the tongue help prepare food for digestion and keep the mouth moist.

The hypothalamus, located within the brain, regulates the conservation, replenishment, and elimination of water. It can be affected by the type of water you drink, since inorganic mineral deposits can impair its functioning. Also easily damaged by impure water are the thyroid, the adrenals and the pituitary glands.

The pancreas has as its function the manufacture of digestive juices and insulin, and it utilizes water in their manufacturing.

The uses of water in the body are so multifarious that we can't begin to list them all here!

4. Water In Our Diet

Since water is so important to the proper functioning of our organism, it's crucial that we come to an understanding of when to drink, how much to drink and what kind of water is best fit to drink.

4.1 Natural Diet Is Water Sufficient

Firstly, we should stress that there are no hard and fast rules as to how much water a person needs. Those people eating of man's natural dietary—raw fruits, vegetables, nuts and seeds—will certainly need less water than a person eating a conventional diet of meats, breads, cooked foods, etc. A person accustomed to the Hygienic diet partakes of a diet that is basically water-sufficient. Under most circumstances, the foods themselves contain enough water for optimum functioning. The naturally ripened fruits that we eat typically contain upwards of 80% of the purest distilled water. Such water is ideal for human consumption.

4.2 How Much Water Should Be Drunk

There are instances, nevertheless, in which a person subsisting on the Hygienic dietary might need additional water. Such times would include days of heavy toxin elimination and during a fast. We also may need additional water when exerting ourselves in the hot sun. The body will determine its particular water needs and manifest this need as thirst. We should readily accommodate our thirst with water of the purest kind.

A person who eats a typical American diet containing processed junk foods, salt and seasonings, cooked foods, etc., must drink a great deal more water than someone partaking of a Hygienic diet. This is true because the typical American diet is far from being water-sufficient. The high salt content in most of these "foods" requires the body to demand a large amount of additional water to hold the salt in solution so that it won't harm body tissues. The same is true of many of the condiments and spices such as pepper and garlic, commonplace in processed foods.

More insidious food additives such as monosodium glutamate must also be kept away from the cells in a

highly diluted form so that they are not immediately toxic. Even a moment's thought will reveal that the body considers such substances as toxic; or else why keep them in diluted solution? Even in such a diluted solution, some of the toxic materials may cause damage. It would seem sensible to avoid such toxic material, thereby saving the energy needed for their elimination.

Some health advocates prescribe that we drink anywhere from three to eight, or even more, glasses of water daily. My suggestion is: Listen to your body! Partake of a diet that is basically water-sufficient in itself. If you find that you need water in addition to the water you get from foods, let your thirst guide you as to how much you should drink.

4.3 When We Should Drink Water

Now we must consider when to drink. Drink only when really thirsty, and never drink during a meal or directly afterwards. If you must drink near mealtime, it is suggested that you drink at least thirty minutes before eating or two hours after eating. When drinking with meals, we often have the tendency to swallow food that is only partially masticated. In addition, the water will hinder the process of digestion by diluting the digestive juices. Of course undigested or partially digested food is toxic and cannot be assimilated.

5. Water: Is It Fit To Drink?

The importance of water in our diet has been well established. Although it is best for us to obtain our water from food sources, sometimes we need additional water.

For example, when a person works in the sun for several hours on a hot day, his need for water will be proportionately greater than the water content of most foods. When the need for additional water exists, what kind of water should be taken?

5.1 Tap Water and Its Processing

Most folks in this country drink the water that is easily available to them. Commercial "purified" tap water is easily available and is used for drinking water by the majority of people. Nevertheless, few of those drinking such water are aware of exactly, what constitutes the water they are drinking. At least in the United States, most people drink their tap water without giving it a second thought.

Any person who carefully considers the nature of tap water and its constituents will be unlikely to continue to drink it. Besides the barrage of chemicals added to the water at the "purification plant" (which we'll go into later), in most cases the water must travel through an intricate web of pipelines before reaching its destination. These pipes pose the additional danger of adding even more unneeded materials to the water.

Through man's continual disregard for the purity of his environment, almost all of the natural waters of the earth are contaminated by chemical pollutants. For instance DDT has been found in the far reaches of the North Pole area. Among the pollutants of our natural water are: soap, wood pulp, oil, sulfuric acid, copper, arsenic, paint, pesticides and even radioactive wastes! Among the most prevalent inorganic minerals in our waters, which are unusable by and toxic to the body, are calcium, magnesium, sodium, chlorine and sulfur.

It is unfortunate that so many pollutants are in our natural waters. What is even more unfortunate for the tap water drinker is that still more chemical pollutants are added to the commercially available water

supplies. These chemicals are added supposedly in a effort to purify the water and kill its "disease-producing bacteria." The chemicals are more harmful, though, than the bacteria they're supposed to rid the water of!

Let's take a closer look at the major methods commonly used in water treatment.

1. *Sedimentation*: When water is allowed to stand still, its heaviest particles will naturally settle to the bottom. This principle can be easily illustrated by stirring some standing water. If you stir up the bottom and watch for awhile, its murkiness will dissipate and it will become relatively clear again in time. Particles that tend to sediment include sand, rocks and heavy particles that are not chemically bonded with the water itself.
2. *Filtration*: Filtration is a process that strains out particles in the water that do not settle. Commonly, the water is allowed to pass through some kind of porous material, such as sand or diatomaceous earth. The porous material acts like a net and captures the particles in the water mixture. Water is sometimes put under pressure in the filtration process.
3. *Coagulation*: Coagulation is a process that involves the use of jelly-like binding materials. These materials can include aluminium hydroxide, aluminium sulfate and activated silica. The theory goes that these chemicals will bind with impurities and cause them to settle out. However, there's a great likelihood that at least trace amounts of these toxins remain in the water after this process.
4. *"Softening"*: Many of the waters used for commercial water supplies in this country are originally "hard," mineral-laden waters. In water treatment facilities, chemicals such as calcium hydroxide and sodium carbonate are added to the water. These substances form chemical bonds with the "hardening" minerals, particularly calcium and magnesium. The resultant chemicals from the reaction are then filtered as much as possible.
   Sometimes this filtering is done by a process called reverse osmosis, whereby the purer water is transported towards the area of least salt (mineral) concentration. This process is literally the reverse of normal osmosis and is done by artificial means of transport such as water pumps.

   The idea of removing hardening minerals from the water we drink is in accordance with Hygiene. But we just can't agree with this methodology. Anytime unnatural substances are added to the water, our chances of ingesting these chemicals substances are increased. Since it is true that our body can use only the water content of the water we drink, it is best to avoid water that has been chemically softened.

5. *Chlorination*: With few exceptions, chlorine is added to the water supply of every large city in the United States. It is added at the rate of approximately one-half to one part per million. Theoretically, chlorine is added to the water in order to poison and kill the germs contained therein. However, we must only remember World War I to imagine the deadly effects chlorine produces in the body. Chlorine has, for instance, been found to be a contributing factor in atherosclerosis. From my own childhood experience, I can remember swimming in a large chlorinated pool, and to my chagrin, a bucketfull of chlorine was added to the water in which I was swimming! Fortunately, I was not seriously injured— it probably was not a strong chlorine solution. However, I can still remember the stinging of my skin and the feelings of nausea and disorientation I experienced from even such a short exposure. From this experience, I must question the advisability of taking any amount of a deadly toxin such as chlorine into the body! Even such a small amount as one part per million, which is considered "safe" by the scientific community, is actually harmful.
6. *Bromine and iodine addition*: In lieu of chlorine, which is by far the most widely used germ killer added to commercial water supplies, bromine and iodine are sometimes added. Both of these substances are deadly poisons to humans and are best avoided.
7. *Fluoridation*: Probably there is no more controversial additive to water than fluorine. These major reason usually cited in favor of fluoridation is its supposed value in the protection of teeth. Some studies have shown that, at best, fluoridation only delays decay. Others have shown no improvement at all in "dental health" from the use of this poison.

Reasons aplenty exist, however, for the avoidance of fluoride. If excessive fluoride consumption persists, teeth stains and mottling of the teeth, eventually resulting in brittleness, can ensue. The Mayo Clinic department of Orthopaedics wrote that, although fluoride administration has been shown to stimulate new bone formation, the bone formed thereby is poorly mineralized.

Fluoride is mainly stored in bones, and it increases skeletal mineralization. In tests with animals, it has been found that abnormal amounts of bone formation occurred in those animals to which fluorine was administered. Fluoride can contribute to the calcification of ligaments and tendons —even eventually contributing to the spine become a solid column of bone.

In addition to bone storage, fluorine can be stored virtually anywhere in the body, including the aorta, the main bloodflow artery of the heart. There is considerable evidence that fluorine impairs kidney function. In some studies, fluorine has been linked to genetic damage, birth defects and cancer. Fluorine can even react with the hydrochloric acid in the stomach and turn to highly corrosive hydrofluoric acid. This acid can lead to hemmorhaging in the upper gastrointestinal tract!
Clearly, the harmfulness of fluorine in our waters is abundant! Surely the dubious benefit of "protection of the teeth" cannot compare to the known health detriments of fluoridation.

Fluoride, as it is added to water, is in an inorganic, unassimilable form. Although fluoride can be found in the bodies of people with healthy teeth, it is also sometimes found to be absent. What has been stated above is ample cause for the avoidance of fluoride and its concurrent pathological effects.

We've not even discussed all the possible problems to be found in tap water. Its toxins include lime, soda ash, fluorine, chlorine and sulfur. Some city water supplies have been found to contain many other substances thought to be carcinogenic. Perhaps the most important thing to remember about tap water is this: It's more than just water! The chemicals added to the water are unusable poisons; the inorganic minerals in that water are little better! Let's relegate our tap water to uses other than for drinking, and our health will benefit immeasureably.

It is our hope that this discussion of tap water has convinced you of the merits of its avoidance! Let's continue our discussion of other types of water you might consider drinking.

5.2 Salt Water

Lots of folks are proclaiming the health benefits of sea water and sea salt. They say the complement of minerals in sea water is similar to our blood. Yet sea water is not a food; its drinking occasions vomiting and can produce death. Sailors will die of thirst before drinking it. All its elements are in an inorganic form (see the next section on mineral waters) and are unusable by and toxic to the body. Its salt content requires extra pure water to keep the salt in solution away from body tissues. We're best off avoiding sea water as well!

5.3 Mineral Water

A huge controversy exists concerning the beneficence of mineralized water in the diet. This subject is fully discussed in the book *The Great Water Controversy* by T.C. Fry, Herbert M. Shelton and others. Some of the most important things to remember about mineralized waters are:

1. As was discussed in Lesson 10, minerals cannot be used by the body unless they are in their organic unfragmented form. The body must expend considerable energy to expel these unneeded materials from the body before the water itself can be cured.
   Let's go into this subject a bit more fully. Minerals are only usable to the body as they are found in organic forms of life such as plants. Only plants form the link between the earth-minerals and animal life! We cannot digest rocks. Although inorganic minerals may have the same chemical

composition as the organic minerals, they differ in structure and in the relative position of the component molecules. This difference is crucial, for it determines the usability of the substance by the body.

How does a plant transform earth's inorganic minerals into usable forms? First, the plant takes in sunlight, carbon dioxide, water and elements from the earth. By the process of photosynthesis, the plant's chlorophyll captures the sunlight and forms carbohydrates from water and carbon dioxide. In the process of the growth of the plant, the minerals from the earth become organically part of the plant itself. Then, and only then, can the minerals be considered assimilable by the body.

2. The inorganic minerals found in mineral water are deposited by the body in tissue structures and bones. Mineral deposits can lead to kidney stone and gallstone formation, hardening of the arteries, ossification of the brain, arthritis and heart disease. Inorganic minerals excreted through the skin can cause tissue degeneration.
3. When harmful substances enter the body, they are encountered by the white blood cells, which are a part of the body's inherent defense mechanism. Continued ingestion of harmful substances, including inorganic minerals, can result in an over-proliferation of the white blood cells. This condition is called leukocytosis.
4. It has been suggested that the different stages of life—from infancy to old age—are just differences in the state of ossification of the body parts. The major difference in body tissues between youth and old age is the greater rigidity and toughness of tissues in advanced age.

5.4 Rainwater

What can be more refreshing than a soothing summer shower? Rainwater was once a prime choice for drinking. However, we must begrudgingly recognize that the "waste products" of all the technological boons of mankind have befuddled our waters. Our atmosphere is polluted badly, and rainwater tends to absorb and wash these toxins out of the air.. Although that's great for the air, it makes rainwater drinking unfeasible in most circumstances. If you have a heavy rainstorm and begin collecting water several hours into it, chances are the water will be good (unless you live in an area where the. air is severely polluted). Otherwise, rainwater is, best avoided for drinking.

5.5 Wellwater

Most well waters are heavily laden with inorganic minerals. When this is the case, well water is best left in the ground or used only for cleaning, swimming and bathing.

5.6 Spring Water

Some spring waters are heavily mineralized; others are fresh and soft. When you buy spring water from the store, there's little way of knowing just what you're getting. Soft pure spring water can be good to drink—but unless you know it's soft and pure, pass it up!

5.7 Distilled Water

Distilled water is the purest water available. Nothing but water is in it. When the need for additional water other than what we get from our diet exists, distilled water is unequivocally the best choice for drinking.

Perhaps the most prominent objection to the use of distilled water, is that distillers are not to be found anywhere in nature, although the process is a natural one. For great health, it is necessary that we partake of foods, air and sunshine as they are found in nature. To the great discredit of exploitative humankind, our natural waters have been fouled to the point of toxicity with the waste matter of our so-

called "advanced" civilization. It is for this reason that it's dangerous to drink even rainwater! Distilling water is perhaps our only real choice in insuring the purity of our drinking water. Nevertheless, it is a shame that we must use unnatural mechanical procedures to make pure water available to our bodies once more.

The proponents of hard water drinking have claimed that distilled water is dangerous to drink because it leeches out minerals from the body. There is some truth in this statement, but not the way they mean it. Distilled water does aid the body in removing harmful, disease-producing inorganic minerals from the tissues and bones where those not eliminated are stored. However, distilled water does not leech out the organic minerals that have become part of our cellular structures. We must remember that the body chooses what it does with the water that is ingested. The water does not act upon the body. It is the body that acts upon the water! The body will relegate the proper usage of the pure distilled water it receives.

6. Sources Of Pure Water

Fresh raw fruits are our best source of pure water. The plant itself has already done the distilling! There are no intermediate steps needed.

Our body is about 60-70% water; fruits are typically 80-90% water! Vegetables are high in water content, too. If we eat an abundance of fresh raw fruits, including melons in the hot seasons, little or no water for drinking will be needed!

There are no "dry" foods. Sunflower seeds are approximately 5% water. At the other end of the scale, watermelon is around 92% water. It's sweet and delicious, too!

Here are some typical water contents of easily available fruits and vegetables:

Food	**Percentage Water Content**
Avocados	73%
Grapes	81%
Bananas	75%
Oranges, Peeled	86%
Peaches	89%
Strawberries	90%
Celery	94%

Broccoli	89%
Lettuce	95%
Tomatoes	93%
Cucumbers	95%
Carrots	88%

Even "dry" vegetables have high water content. Potatoes are almost 80% water.

If nuts and seeds are eaten, the possibility of need for additional water increases. Pecans are about 3% water, cashews 5%, almonds about 5%, and brazil nuts are about 4% water.

The water in raw fruits is preferable to that found in vegetables. The water in vegetables, especially the water in the leaves, has not been distilled by the plant to as great an extent as in the case of fruits.

When you need water, such as when you're fasting, working in the sun, or if you've deviated from a water-sufficient diet (heaven forbid!) then you need pure distilled water. Distilled water may be purchased commercially. However you should be careful in its purchase and usage. If it has any odor, color or taste, it should not be used.

The best way to ensure your pure distilled water is truly pure and distilled is to do your own distillation. However, you should take care to purchase the proper noncontaminating distilling equipment.

Distilled water is obtained by a mechanical method in which water is first heated to boiling. Then the resulting vapor, which has separated from the boiling water, is collected. In the process, the chemicals and sediments in the water are removed, leaving only the water.

Since distilled water has a fantastic ability to dissolve metals and minerals, it should only be stored in glass or stainless steel. We suggest you store it in a narrow-necked container so it will have as little contact with the air as possible; also, keep distilled water from air contact by keeping the container closed.

High-quality steam distillers, using stainless steel and glass components, should be used in distilling water.

7. The Choice Is Yours

Now you have done a good deal of thinking about what type of water is best fit to drink. As a less burdensome (and hopefully more fun) way of reviewing some of these ideas, let's now listen to a group of drinkers and see what they have to say about the virtues and vices of drinking their respective beverages.

The setting for the following conversation is in the living room of a home shared by three young men. It's Friday evening, and some friends and neighbors have come by to celebrate the beginning of the weekend.

Frank: Ahhhh! There's nothing like a refreshing cold beer to start the weekend right! *Ted*: I don't believe it. *(disgusted voice)* No matter how much I tell you that beer is bad for you, you still guzzle the stuff. Man, that alcohol goes right into your stomach lining! Not to mention it'll raise havoc in your whole digestive tract.

Frank: Aw, I've been drinking beer for years and I'm never sick.

Julie: C'mon Frank, I'll go to the sink and get you some water. Maybe that'll please your worried friend.

Ted: With, all the chemicals in that stuff, you might be better off with the beer! *(At this point John and Amy enter the room.)*

John: I couldn't help overhearing your little discussion. I started drinking spring water a couple of years ago. It's full of minerals which I'm sure we need. You want some, Frank?

Frank: Nope. You just don't get that good feeling from water that you get from beer. Besides, this beer is made from spring water. Does that make you feel better, Ted?

Ted: No way. Mineralized waters, including spring water, are full of inorganic minerals. Those minerals are poison to your body. And, oh yes, Frank, just because you're never showing the symptoms of illness doesn't prove you're not sick. Maybe your beer drinking proves that you are sick though *(laughs)*.

Julie: Ted, you're just never satisfied. I went to the faucet to get a drink. I suppose I'm going to die because of that?

Ted: Well, you might. All the toxic chemicals in tap water are best avoided. How many miles of pipeline did that have to go through?

Ann: Well, I'm drinking some distilled water.

Julie: Let me have a taste (Sips the water) It tastes like nothing!

Ann: That's right! Pure water has no odor or taste. And it doesn't have any inorganic minerals to clog up your system or be deposited in your body.

Ted: Well, Ann, you've got the right idea in my opinion. As long as you're going to drink at all, you're best off drinking distilled water.

Frank: What do you mean, "as long as you're going to drink?" You'd die if you didn't! *Ted*: Not necessarily. If you eat mostly raw fruits and vegetables, which is man's natural diet, you will need little or no more water than is found in the foods you eat. *Frank*: Yeah, right. Anybody wanna go for a burger?

We can't hope to legislate the behavior of everyone around us. Ultimately the choice for what we put into our body is individually ours alone. "What'll it be, Mac?"

8. Questions & Answers

If fluorides in the water are supposed to help fight cavities, why does an excess of them result in brittling of the teeth (and bones)?

> In truth, adding fluorides to water is an economic measure, not a health measure. Fluorides are industrial waste products for which a market was created for the economic advantage of the people in industry. It's not that it's wrong to seek profit or economic advantage; however, it is when it's at the expense of people's health.

The fact is that fluorides in water do not help fight cavities. The tests that supposedly proved that were no doubt done by researchers who had a vested interest in the results or who were paid off by those with a vested interest. It is sad but true that this kind of thing goes on.

While "excess" fluorides will result in brittle teeth and bones, smaller amounts cause problems of all kinds, too. As stated in the lesson, fluorides are toxic. All toxins are carcinogenic and interfere with normal body functioning. Anyone seeking health should stay completely clear of known toxins, including fluorides.

You spoke of water containing impurities, and you mentioned inorganic minerals, chemical additives and softening agents. Are there other impurities in water? If so, what are they?

Anything and everything in water is an impurity. The main reason why waters usually contain so many impurities is because water easily dissolves many substances. That is to say, many substances are water-soluble.

The most salient impurities in water include both living and dead organic matter, including bacteria; corrosion products from pipelines, including lead, zinc, copper and iron; carbon dioxide, which enables water to take calcium, magnesium and lead into solution; iron and manganese, which are taken into solution in the absence of dissolved oxygen; and algae.

Some of the impurities in water make it taste very bad or give it an unappetizing color. Organic matter may decompose and make water smell unappealing. Inorganic minerals in water make it hard, and hard water, because it's already holding so much in solution, is not as good for washing and cleaning as is soft water. For the purposes of this course, keep in mind that impurities in water are toxic in the body and contribute to the need for diseases.

You spoke of hard water and soft water. What do you mean by those terms?

Soft water is water that is deficient in or free from inorganic mineral substances, such as calcium and magnesium salts, that prevent lathering of soap. Hard water is water that contains enough calcium, magnesium and other mineral salts to prevent the lathering of soap.

As you can see, water does not have to be devoid of minerals to be labeled "soft." It only has to be "deficient in" minerals, to the extent that soap will lather, to be labeled "soft." Needless to say, distilled water is the softest water there is, since it is devoid of inorganic minerals. However, not all soft water is distilled or good for drinking. Many spring waters are softer than most well waters. Sea water is hard water, as are mineral waters, by definition. In fact, hard water is just another word for mineral water—or vice versa.

As a final note, I might mention that water that is softened by addition of chemicals is more harmful than waters that are naturally soft or are distilled. Naturally soft waters are harmful to whatever extent they contain any impurities. As stated in the lesson, distilled water is the only water fit for drinking.

What kind of water should be used for bathing?

The water used for bathing is not so crucial as is the water used for drinking. Soft water is preferred over hard water because its greater solubility means that more dirt, oil, etc., from the body can be taken into solution in the water. Hence, you can get cleaner more easily when you bathe with soft water.

You presented an entire lesson on water without mentioning the use of water in enemas, colonics, etc.! Please speak on these subjects.

> The only place where water should enter the body is through the mouth. The body does its own cleaning of its internal parts. Putting water in parts of the body where it doesn't belong constitutes interference with normal body processes. It is enervating to take enemas or colonics, and enervation leads to toxemia and disease.
>
> The symptoms of enervation that people experience after an enema or colonic are usually mistaken for symptoms of well-being. This is a common error, but one that needs to be corrected if health is to be obtained. An analogy can be made between enemas and drugs. Amphetamines, also know as "uppers," definitely give a feeling of well-being. Yet, they do not bring health and, in fact, are extremely detrimental to the health. Just because something makes you feel good (at first) does not mean it is good for you. It could be that it's stimulating and enervating you and setting the stage for disease.

Article #1: The Fountain Of Life by Herbert M. Shelton

Water, from the dew that distills on the rose leaf to the ocean that heaves its vast tide around the world, is one of the many wonders of existence. It makes the beauty of our silvery clouds and golden sunsets; it spans the heavens with the hues of the rainbow; it dances to earth in April showers; it murmurs in brooks and thunders in cataracts; it waters the earth, bids plants to grow and carries our commerce over vast seas. Without it the earth would have forever remained one vast, barren rock—a lifeless desert upon which the winds would sweep up the dust.

Water has given the earth its covering of soil and carpeted this soil with verdure. Deprived of water, plants droop and wither; without water, animals thirst and die. No wonder an early writer has left us the thought that at the dawn of creation the spirit of God moved upon the face of the waters. There is no life without water.

The foregoing eulogy of water is paraphrased from Dr. Thomas Low Nichols. We need only add that, without water, no seed could germinate, no plant could grow. What wonder, then, that water has so often been worshipped as the source of life. The Egyptians worshiped the Nile, the river that made possible their yearly crops, their life and civilization. The Hindus worship the Ganges. Are these people doing other than paying tribute to one of the basic elements of living structures and functions?

Water is a primal need of all forms of life. We have previously emphasized the fact that the cells require a liquid home and that dehydrated protoplasm is as lifeless as dust. It is only in a liquid environment that sperm and ovum can meet and mingle; it is only in a fluid medium that cellular reproduction can take place in the complex body; it is in a liquid medium that the embryo evolves towards maturity. It is only by being dissolved in water that the elements of vegetable matter take on their beautiful forms and colors.

The mystic motto of Thales, "Ariston men hydor" (the best of all things is water) might, perhaps, be explained by the fact that dehydrated cells are as lifeless as dust. In a similar vein, Goethe said of the elements of liquids: "They come from heaven and rise to heaven, returning again to earth." Water is so essential to life that none of its functions can be carried on without it.

Deprive man of water and he is soon reduced to a few pounds of dust. His body is about 70% water, his blood 90%. Water forms the greater part of his brain and nerves. The eyes are composed of little sacs of transparent water. Water not only enters the composition of all his tissues, but those tissues that have least water also possess little vital endowment.

Bone, which is the most passive tissue of the body, has much less water than muscle, which is very active. Water is the grand agent of all man's vital functions. It is essential to the process of assimilation and disassimilation. A lack of water soon manifests itself in failure of function. Not a particle of nutriment can enter one's blood and from there is taken to the cells until it is first dissolved in water. It is water that carries nutriment to the cells; by water, also, the body carries its waste from cells to be excreted. Those who have worshipped oceans and rivers have not been so far wrong in regarding water as a sacred element.

The fountains of Greece were chosen as sites for her temples. Water was the symbol of purification among the Jews; in baptism it became a similar symbol among the Christians. How appropriate was the symbol! It is not only the best medium with which to cleanse the surface of the body, but it is the only medium by which internal waste can be carried to the organs of excretion. It is the only medium capable of circulating in all of the tissues of the body and penetrating their finest vessels without irritation or injury.

Without water, the blood, lymph and tissues could not be kept sweet and clean. It might almost be said that water literally cleanses the tissues.

As water is being constantly lost from the body in its excretions—sweat, breath, urine, feces, mucus—there is need to frequently replenish the supply. Water is the only drink, although we do not take as drink all the water we use. All other fluids we take are either foods (fruit and vegetable juices, milk, soup, etc.) or poisons (beer, wine, whiskey and other alcoholics, tea, coffee and poisoned soft drinks).

There is water in everything we eat, so that under many circumstances of life, it is possible to get all the water the body requires in foods without the necessity of taking other water. While fountains bubble and rivers run, water will not be abandoned by those who love the welfare of their body.

Man's lifelong water requirement is associated with his continuous secretion and excretion. He expels water through the lungs each time he exhales; he loses water through his skin continuously; he loses water through the kidneys just as continuously; he loses water through the bowels and mouth at all times. Because of this continuous loss of water, he must replenish his supply at intervals, the frequency of replenishment depending on the rate of loss. Water evaporation through the skin is hardly noticeable when he is resting; if it is warm or if he is very active, he sweats more; hence there is greater water loss.

The evaporation of water from the skin is a most important arrangement for control of body temperature. Man's normal body temperature is supposed to be 98.6°F., although there is reason to think that this, like all the other "norms" of life that have been accepted, may be slightly high. Heat regulation is of great importance to the body. But sweating serves another important function; namely, that of maintaining normal water balance of the body. Too much or too little water in the fluids of life means trouble. If there is too much water, increased sweating helps to reduce this; if there is too little water, reduced sweating helps to conserve the water supply.

It is said that water is the life-supporter and that more should be taken than thirst demands. But no good reason has yet been offered for the implied principle that thirst is an unreliable guide as to how much water is needed. Dr. Trall stated: "Only a very small quantity of water is necessary as a drink, provided our dietetic and other voluntary habits are physiologically correct. The vast quantity usually taken to the stomach is called for by the feverish and inflammatory state of the system produced by concentrated food, flesh, salt, spices, etc." There is no fixed quantity of water that one must drink during the day. The amount needed is determined by a variety of factors. Age, sex, temperature, activity and the character of food eaten are the chief factors that determine the amount of drink required. It is, therefore, stupid to lay down any hard and fast rule (such as one must drink six glasses of water a day) about the amount of

water needed. When it is hot and we sweat more, we drink more; when it is cold and we sweat less, we drink less. If we are active and thus sweating more, we need more water than when we are inactive and sweating less. Thirst guides us in drinking as hunger guides us (or should) in eating.

That drink which has no fumes is good for us. It leaves us to sing over our daily labors with ruddier cheeks, purer feelings and brighter eyes than alcohol can bestow. When water is neglected for Old Port, and sleep is traded for *stimulants* and *narcotics*, when the beauties of nature and the virtues of walks in the country are exchanged for the "thrills" of intoxicants, not only are the real pleasures of life greatly reduced, but the powers of life are also lessened. Water is the great cleanser and purifier. This has received recognition in religion as in daily life; it is the great thirst quencher and menstruum of vital activities.

Water serves its various functions in. the body in proportion to its purity, and not in ratio with which it is laden with minerals and organic substances. Mineral waters and waters that carry quantities of organic impurities are, to the extent that they are thus laden, unfit for use. The old medical notion that water so foul the cows won't drink it is good *medicine*, is but another of the false notions that have been fostered by this profession. The present-day notion that only drugged water (water that has had iodine, lime, chlorine and fluorides added) is fit for human use, is a damaging fallacy.

Not many years ago, mineral springs, sulphur springs and hot springs were special resorts of invalids. When, in some out-of-the-way spot, a farmer found a spring with water so strongly impregnated with "bad smells" and "foul taste" that thirsty cattle would not drink it, he imagined himself possessed of a prospective fortune. Here is a pool, he would say to himself, with water possessed of *curative properties*. A hotel would be erected near the pool or spring, physicians would send patients there to drink the water and bathe in it, and many remarkable *cures* would be reported.

The faith in the *curative* or *medicinal* virtues of mineral waters simply means that the fundamental principle of drugging—that poisons are *medicinal*—has been applied to drink and that impurities have been mistaken for wholesome properties.

Animals, like man, if forced to drink offensive water from springs, learn, as man does, to *relish* it. It is just possible that they learn, also like man, thereafter to find the pure, soft water they once relished to be flat, insipid, unendurable. We know that animal tastes are susceptible to perverse cultivation as much as are man's.

We pollute our water supply as persistently as we do our air supply. Our cities drain their sewage into the rivers and lakes and into the waters along the beaches of the country. Many beaches have had to be abandoned, so great has been the pollution. Some of our lakes smell to high heaven with the odor of sewage. Commercial concerns, manufacturers, etc., drain the refuse of the factories into the streams. Poison sprays poured over the vegetation of the country are washed down to the streams and lakes. With one stroke we poison the soil and the water. Spraying kills plants, birds, bees and many forms of animal life.

It has been found that many of the detergents, germ killers, insecticides, herbicides, various solvents and other synthetic chemicals now so freely employed in our determination to solve all our problems by poisoning the whole world, pass unchanged through (sewage) treatment plants to water courses and unchanged through water treatment plants to consumers.

Some of the detergents seep through the soil into wells, enough sometimes to cause the water to foam when shaken. Even more ominous than these sources of water pollution are the radioactive substances in fallout and from plants engaged in industrial production of fission products. Modern industrialism is rapidly destroying all of our natural resources in the name of "progress," "development," etc., but actually, for the profits it derives from exploitation of the workers and natural resources of the nation.

Rainwater, soft water from an uncontaminated spring (many springs do not provide soft water) or distilled water are the only waters fit to drink. Filtration removes all impurities suspended in water, but it does not remove those held in solution. We are told that distilled water is dead. There is no such thing as

live water. We are told that distilled water, being free of minerals (dirt), leeches the salts from the tissues of the body. Were this true, the only water that is fit to drink would be that which is fully saturated with minerals.

Short of complete saturation, the water would still have a tendency to rob the tissues of their minerals. Ordinary drinking water, containing some mineral matter, would merely rob the tissues of fewer minerals than does distilled water. Water serves, in the blood, to carry minerals to all the cells of the body. Not the crude mineral matters of the soil, but organic salts of foods are the substances it should carry to the cells. There is no evidence that distilled water does not yield up these salts to the cells as readily as does mineral-laden water.

William Lamb, M.D., of England took the position that man is not normally a drinking animal, but that sufficient water for all his purposes is contained in fruits and vegetables and that these should constitute his diet. More than 50% of our food is pure water. Why, then, do we have frequently to take in water other than that contained in our foods? Because we are constantly giving off water in the form of sweat, urine, vapor in our breath and water in our stools, and we give off more than the food supplies.

This is not always true. Many factors determine the amount of water the body loses, and in many instances the food supplies all the water needed. In other instances, it does not. A man working in the fields in the heat will pour out such quantities of water that he will need extra supplies. A stenographer working in an air-conditioned room and taking a diet containing much water may not need any extra water. Our diet, in fact, is often much too dry and may be improved without resort to beer, coffee or tea; but there remain many conditions in which life is glorified with a glass of cool, clear, soft water.

It is advocated in some quarters that fruit and vegetable juices be taken instead of water. This is an irrational program. There seems to be some thought associated with this practice that water is, somehow, an evil. The relations of water to the living, healthy organism and the purposes it serves in the various functions of the body are proof that water is both safe to use and essential to life. As it constitutes the greater portion of the body, there is no reason to fear it. The hydrophobic individual who drinks fruit and vegetable juices instead of water is certainly eating between meals. He is certain to overeat and unbalance his metabolism. Substituting fruit juices for water is not altogether unlike the effort to substitute the oxygen in foods for the oxygen of the air.

It should be understood that milk is not a drink, but a food. We get milk from animals who have prepared it for the nourishment of their young. Fruit and vegetable juices are also foods, not drinks. Liquid foods should be understood as such, and should be thought of as drinks. Soups are also liquid foods. Coffee, tea, cocoa, chocolate beverages, soft-drinks and similar beverages should be understood to be, not drink, but poison.

It is possible to drink too much water and it is possible to take too little. Both extremes are hurtful.

We come to the habit, a cultivated one, of drinking with meals. Our rule should be *never to drink with meals*.

Water, fruit juices, vegetable juices, soups and other fluids taken with a meal inevitably dilute the digestive juices and alter their pH. This retards the processes of digestion. Coffee, tea, cocoa, chocolate drinks and all drinks that contain toxic substances and not only dilute the digestive juices, but also add the inhibiting effects of tannic acid, caffeine, theine, theobromine, etc., to the retarding effects of liquids in general. Such substances with meals cannot be too strongly condemned.

In some quarters, drinking immediately before meals is condemned. If this condemnation is applied to all liquids except water, *Hygienists* can endorse it. But water remains in the stomach such a short time after ingestion that it may be taken five to ten to fifteen minutes before a meal without interfering with the digestive process. The other liquids (which are either foods or poisons) are not so quickly expelled from the stomach. The current practice of drinking vegetable juices and fruit juices shortly before meals is ruinous to starch and protein digestion.

It is generally safe to drink an hour to an hour-and-a-half after a fruit meal. (We formerly said drink could be taken half-an-hour after a fruit meal, but in many cases fruit remains in the stomach longer than this.) Starches require a maximum of two hours to digest in the stomach, so it is usually safe to drink that long after a starch meal. Proteins require about four hours for gastric digestion. It is wisest to wait that long after a protein meal before drinking.